

• MICRO AIR VEHICLE UPDATE

• NASA'S UAVS GOING OPERATIONAL

AVIATION WEEK & SPACE TECHNOLOGY

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Measurement program. Flights began in late 1996 and most recently were made in Hawaii in April and May, carrying about 330 lb. of payload (*AW&ST* Nov. 11, 1996, p. 54). ERAST funded the recent flights to demonstrate what the aircraft could do, and plans to complete a program milestone to fly it above 55,000 ft. for 4 hr. in the next month.

Aurora's Perseus B drone is also to show its capabilities this summer. Engine power has been increased, auxiliary fuel tanks have been added under the wing, and the flight control system tweaked to make an 8-hr. flight at 60,000 ft. The Earth Science Enterprise contributed \$1 million for this demonstration.

THE ERAST TEAM IS CONSIDERING whether to replace the highly-turbocharged Rotax piston engines in Altus 2 and Perseus with a turboprop engine for more reliability.

One problem in marketing drone services to scientists is competition from Code Y's manned aircraft, primarily the ER-2 derivative of the Lockheed U-2. ER-2 operations are subsidized by Code Y and scientists find it cheaper than unsubsidized drone rates. The upcoming program to subsidize data collection by drones "will let us see if the scientific community has interest, and what sort of vehicles they choose," Yuhas said.

The goals of ERAST will start shifting in Fiscal 2001 with the start of a new project, tentatively called "ERAST 2." The original ERAST is to be stopped in 2002-03 to comply with NASA criteria that projects have a definite end, and ERAST 2 will con-



Perseus B has a highly turbocharged Rotax piston engine with external radiators and intercoolers. External fuel tanks have been added for this summer's flights.

tinue with drone goals that were not part of ERAST, such as inflatable structures and thin film solar cells, Sharkey said.

To reach 100,000 ft., the Centurion needs to be fitted with solar cells. The program already has \$1.8 million worth of 19% efficiency cells for one wing panel, and plans to spend at least \$6 million to buy 19% and cheaper 14.5% cells for the rest. The span may be extended to 250 ft. by inserting a sixth wing panel in the center, to compensate for the performance shortfall from the money-saving 14.5% cells. Integration and operations costs will add another \$6 million to make the record flight from Kauai, Hawaii.

The cost to convert Centurion into Helios for the 96-hr. flight is the \$20 million to develop the lightweight fuel cell and about another \$12 million for integration and operations, Sharkey said. The total to

Altus 2 returns to the Barking Sands airstrip on Kauai, Hawaii, after measuring Earth's energy balance in the Energy Dept.'s Atmospheric Radiation Measurement program.

complete the solar-powered goals is \$44 million.

"We've proposed both keeping and eliminating the 100,000-ft. flight," said AeroVironment Vice President W. Ray Morgan. "Not everyone agrees it's valuable." Eliminating the altitude flight could accelerate the long-duration

flight, which Morgan sees as more important to the commercial and scientific viability of solar-powered aircraft. Going to 100,000 ft. would push the state of aircraft design and could be useful in developing an aircraft to fly in the thin Martian atmosphere, Sharkey said.

THE MAIN COMMERCIAL USE pursued by AeroVironment is the communications platform to provide the "last mile" connection from users to a high-speed point-of-presence. Several other companies are proposing similar schemes with aircraft, including Scaled Composites with its manned Proteus (*AW&ST* Oct. 5, 1998, p. 103). The manned aircraft offer larger payload and more electrical power. For example, Proteus would carry a 2,300 lb. communications package consuming 40 kVA of electricity.

AeroVironment believes a solar aircraft can carry a viable payload and will have lower operating costs because of its long duration. A key is adapting spacecraft, instead of terrestrial, communications technology, and AeroVironment's agreement with its spacecraft manufacturer partner provides it access to this technology. With its large 30-40-kw. solar arrays Helios is part-way to being a spacecraft already. AeroVironment will not disclose the iden-

